

61. (New) A fertile transgenic *Zea mays* plant comprising a recombinant DNA segment comprising a promoter operably linked to a first DNA segment encoding an enzyme which catalyzes the synthesis of the osmoprotectant proline, wherein the first DNA segment is expressed so that the level of the enzyme is increased in the transgenic *Zea mays* plant, and wherein the recombinant DNA segment is heritable.
62. (New) The fertile transgenic *Zea mays* plant of claim 61 wherein the recombinant DNA segment further comprises a second DNA segment encoding an amino terminal chloroplast transit peptide operably linked to the first DNA segment.
63. (New) A seed produced by the transgenic plant of claim 61.
64. (New) A method to increase water stress resistance or tolerance in monocot plant cells, comprising:
 - (a) introducing into cells of a monocot plant an expression cassette comprising a preselected first DNA segment encoding an enzyme which catalyzes the synthesis of the osmoprotectant proline, operably linked to a promoter functional in the monocot plant cells, to yield transformed monocot plant cells; and
 - (b) expressing the enzyme encoded by the preselected first DNA segment in the transformed monocot plant cells so as to render the transformed monocot plant cells substantially water stress tolerant or resistant.
65. (New) A method to increase water stress resistance or tolerance in a monocot plant, comprising:
 - (a) introducing into cells of a monocot plant an expression cassette comprising a preselected DNA segment encoding an enzyme which catalyzes the synthesis of the osmoprotectant proline, operably linked to a promoter functional in the monocot plant cells, to yield transformed monocot plant cells; and

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(b) regenerating a differentiated fertile plant from said transformed cells, wherein the enzyme encoded by the preselected DNA segment is expressed in cells of the plant so as to render the transformed monocot plant substantially water stress tolerant or resistant.

66. (New) The method according to claim 65 wherein the expression cassette is introduced into the plant cells by a method selected from the group consisting of electroporation, protoplast transformation, and microprojectile bombardment.

67. (New) The method according to claim 65 wherein the cells of the monocot plant comprise cells of callus, immature embryos, gametic tissue, meristematic tissue or cultured cells in suspension.

68. (New) The method according to claim 65 wherein the expression cassette further comprises a second DNA segment encoding an amino terminal chloroplast transit peptide which is operably linked to the preselected first DNA segment.

69. (New) The method according to claim 68 wherein the second DNA segment encodes a maize chloroplast transit peptide.

70. (New) The method according to claim 68 wherein the enzyme is expressed in the cytosol of the cells of the transformed monocot plant.

71. (New) The method according to claim 68 wherein the enzyme is expressed in the chloroplasts of the cells of the transformed monocot plant.

72. (New) A transformed monocot plant regenerated from the transformed plant cells obtained by the method of claim 68.

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73. (New) A transgenic seed of the transformed plant of claim 72.
74. (New) The method according to claim 65 further comprising (c) obtaining progeny from said fertile plant of step (b), which comprise said preselected DNA segment.
75. (New) The method according to claim 74 wherein said progeny are obtained by crossing said fertile plant of step (b) with an inbred line.
76. (New) The method according to claim 74 comprising obtaining seed from said progeny and obtaining further progeny plants comprising said preselected DNA segment from said seed.
77. (New) The method according to claim 76 wherein seeds are obtained from said further progeny plants and plants comprising said preselected DNA segment are recovered from said seed.
78. (New) The method according to claim 75 comprising obtaining seed from said progeny and obtaining further progeny plants comprising said preselected DNA segment from said seed.
79. (New) The method according to claim 78 wherein seeds are obtained from said further progeny plants and plants comprising said preselected DNA segment are recovered from said seed.
80. (New) The method according to claim 75 wherein the progeny obtained in step (c) are crossed back to the inbred line, to obtain further progeny which comprise said preselected DNA segment.

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81. (New) The method according to claim 80 wherein said further progeny are crossed back to the inbred line to obtain progeny which comprise said preselected DNA segment.
82. (New) An expression cassette comprising a preselected first DNA segment encoding an enzyme which catalyzes the synthesis of the osmoprotectant proline, operably linked to a promoter functional in a host cell, wherein the promoter is selected from the group consisting of the *Glb* promoter, the *AdhI* promoter, and the *ActI* promoter.
83. (New) The expression cassette of claim 82 further comprising a second DNA segment encoding an amino terminal chloroplast transit peptide which is operably linked to the preselected first DNA segment.
84. (New) The expression cassette of claim 83 wherein the chloroplast transit peptide is a maize chloroplast transit peptide.
85. (New) The expression cassette of claim 82 which further comprises an enhancer element.
86. (New) The expression cassette of claim 85 wherein the enhancer element is subject to tissue-specific regulation.
87. (New) The expression cassette of claim 82 which further comprises a selectable marker gene or a reporter gene.
88. (New) An expression cassette comprising
(a) a preselected first DNA segment encoding an enzyme which catalyzes the synthesis of the osmoprotectant proline operably linked to a promoter functional in a host cell; and
(b) a second DNA segment that encodes an untranslated regulatory element, wherein the second DNA segment separates the preselected DNA segment from the promoter.

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89. (New) The expression cassette of claim 88 wherein the untranslated regulatory element is the *AdhI* intron 1.
90. (New) The expression cassette of claim 88 wherein the promoter is turgor-inducible.
91. (New) The expression cassette of claim 88 wherein the promoter is abscisic acid inducible.
92. (New) The expression cassette of claim 88 wherein the promoter is developmentally regulated.
93. (New) The expression cassette of claim 88 wherein the promoter is a constitutively expressed promoter.
94. (New) The expression cassette of claim 88 wherein the promoter is subject to tissue-specific regulation.
95. (New) The expression cassette of claim 88 wherein the promoter is water-stress inducible.
96. (New) An expression cassette comprising:
- (a) a preselected first DNA segment encoding an enzyme which catalyzes the synthesis of the osmoprotectant proline operably linked to a promoter functional in a host cell; and
 - (b) a second DNA segment encoding a maize chloroplast transit peptide, wherein the second DNA segment is operably linked to the preselected first DNA segment.